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<p>(54) Title: METHOD AND SYSTEM FOR ELECTRONICALLY DELIVERING DEFINED FINANCIAL SERVICES FOR LARGE MOBILE PASSENGER CONVEYANCES</p>		
<p>(57) Abstract</p> <p>A financial institution (10) utilizes an automated system. Various services are provided to customers such as providing account information, account debiting and crediting at the customer's request. A communications front end (12) is used to exchange data corresponding to the information using a standard switch network (14). Front end (12) may also be connected with network service provider (16) via a private network (18) and direct wireless service (20).</p> <pre> graph TD 10[10: FINANCIAL INSTITUTION HOST COMPUTER] --- 12[12: COMMUNICATIONS FRONT END] 12 --- 14[14: STANDARD SWITCHED NETWORK] 12 --- 18[18: PRIVATE NETWORK] 12 --- 20[20: DIRECT WIRELESS SERVICE] 14 --- 24[24: CELLULAR WIRELESS SERVICE PROVIDER] 14 --- 26[26: OTHER NETWORKS] 18 --- 16[16: NETWORK SERVICE PROVIDER] 18 --- 22[22: PRIVATE NETWORK] </pre>		

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Method and System for Electronically Delivering Defined Financial Services for Large Mobile Passenger Conveyances

5 This application is a continuation-in-part of copending U.S. Patent
Application Serial No. 09/134,813 filed August 17, 1998, which is a divisional of
U.S. Patent Application Serial No. 08/588,091 filed November 13, 1995, which
issued as U.S. Patent No. 5,796,832 on August 18, 1998; this application also
claims priority to applicant's copending application titled METHOD AND
10 SYSTEM FOR ELECTRONICALLY DELIVERED AND SOFTWARE
DEFINED FINANCIAL AND INFORMATION SERVICES FOR LARGE
MOBILE PASSENGER CONVEYANCES having U.S. Serial No. 60/060,799
filed October 3, 1997.

15 **FIELD OF THE INVENTION**

 This invention relates to a system for providing information and performing
financial transactions and other services in large mobile passenger conveyances
and in particular, it relates to a system that utilizes satellite or other wirelessly
linked terminals for providing financial information, performing financial
20 transactions, and providing other electronic services on large mobile passenger
conveyances.

BACKGROUND

 The proliferation of automated teller machines/customer activated
25 terminals (ATMs/CATs) has revolutionized the banking and financial services
industry by increasing the ability to provide financial services to the consumer.
For example, in the past virtually all consumer transactions were conducted in
person. Thus, consumer access was generally limited to the business hours of
branch locations. With the advent of ATM/CAT and other financial networks,
30 consumers may now access financial services virtually twenty-four hours a day.

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seven days a week. This results in increased convenience and efficiency both for the service provider and the consumer.

Despite these successes, ATM/CAT and other financial networks in use today are characterized by certain shortcomings that limit consumer access and provide a barrier to more widespread accessibility and use, particularly for mobile use such as on large mobile passenger conveyances, including airplanes, trains, and ships. For example, the ATMs/CATs in greatest use today are hard wired in a fixed location. This hard wiring is necessary to provide power for the terminal and to provide access to communication lines, such as telephone lines, over which data may be exchanged with the financial service provider. Security concerns also play a role in limiting ATMs/CATs to fixed locations.

As a result of the fixed location of such terminals, financial networks must take great care in distributing ATMs/CATs over a particular geographic region so as to maximize consumer access. However, these fixed locations do not address the problem of lack of access on large mobile passenger conveyances. There is therefore a need to provide virtual links between fixed service nodes (e.g., ground-based ATMs/CATs) for traveling customers.

The prior art includes a number of attempts to address problems of computer and other access on large mobile passenger conveyances. This prior art includes the following. U.S. Patent 5,311,302 to Berry, et al., discloses an entertainment system for passenger vehicles that includes interactive video terminals at each seat. Passengers can perform such functions as making telephone calls and ordering merchandise. A credit card can be used to pay for entertainment. The device of Berry, et al., does not, however, address wireless banking functions.

An article by Meece ("Plastic to be aboard When Gaming Takes Flight", American Banker 1/7/94, p. 14, vol. 159, no.5) discloses a system that allows use of smart cards on board such passenger conveyances as aircraft and cruise ships. Passengers can pay for such services as video, video games, television, Nintendo, and gambling, using a smart card. The articles do not, however, disclose use of

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real-time banking functions on a network that includes both wireless and non-wireless terminals.

The article by Coulton ("Swissair, Cathay Pacific to Install In-Flight ATMs", American Banker, 20/29/96, p. 20, vol. 161, no. 208) discloses use of ATMs on aircraft. The articles do not, however, disclose use of real-time banking functions on a network that includes both wireless and non-wireless terminals.

The articles titled "BankAtlantic Putting ATMs on 4 Cruise Ships" (American Banker 1/19/96, p. 13, vol. 162, no. 11) and "BankAtlantic Puts ATMs Aboard Two Carnival Superliners" (American Banker, 4/21/95, p. 13, vol. 160, no. 76) discuss use of satellite-driven ATMs on cruise ships. The articles do not, however, disclose use of real-time banking functions on a network that includes both wireless and non-wireless terminals.

U.S. Patent 5,666,291 to Scott, et al., discloses an entertainment system for multi-passenger vehicles (e.g., aircraft). A file server, a local area network, and user stations are disclosed. The device of Scott, et al., does not, however, address wireless banking functions or use of real-time banking functions on a network that includes both wireless and non-wireless terminals.

U.S. Patent 5,568,484 to Margis discloses a telecommunications system for use on commercial aircraft that allows passengers to place telephone calls or be entertained. A credit card can be used to pay for the service. The device of Margis does not, however, address wireless banking functions.

EP Patent EP789502 to Harvey, et al., discloses an in-flight entertainment system that provides passengers with a network that includes on demand video, audio telephone access, and games. The device of Harvey, et al., does not, however, address wireless banking functions.

U.S. Patent 5,379,421 to Palazzi, et al. discloses an interactive terminal that allows passengers of conveyances such as airplanes and pleasure boats to access remote databases. The device of Palazzi, et al., does not, however, address wireless banking functions.

Accordingly, there is a need for a financial transaction and information system which can overcome the aforementioned shortcomings with regard to large

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mobile passenger conveyances. Specifically, there is a need to provide transaction and information terminals that can be conveniently positioned aboard large mobile passenger conveyances as necessary to maximize availability and use of the financial services provided thereby.

- 5 There is an additional need to provide the above-described features without compromising the security provided by existing systems and without introducing inordinate costs and to provide these systems within existing frameworks of ATM/CAT and other financial networks.

10 SUMMARY OF THE INVENTION

- It is an object of the invention to meet these needs, and others, through a financial information and transaction system that utilizes wireless or satellite communication in connection with terminals or other user interfaces to provide banking and other electronic services on large mobile passenger conveyances. In
15 this system, an embodiment of the invention includes a terminal on the mobile conveyance connected to a financial institution via a wireless or cellular telephone hook-up, or satellite communication link.

- It is a further object of the present invention to provide a financial information and transaction system and other services that utilize wireless
20 connection, such as satellite or other wireless communication links, in connection with terminals or other user interfaces within a system that also uses connection to non-wireless terminals in order to provide banking and other services to large mobile passenger conveyances within a single system.

- It is a further object of the present invention to provide dynamic routing
25 that automatically selects among satellite or other wireless communications link based on cost and availability of the links.

- According to a further embodiment of the present invention, the system not only provides the functionality of an ATM/CAT network, but also provides non-financial services, thereby forming an integrated system.

- 30 The present invention comprises a method and system for providing a wide range of electronically delivered financial, information, and other services to

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passengers aboard airplanes, cruise ships, ferries, tour buses, trains and other large mobile passenger conveyances using satellite or other wirelessly linked terminals. The services the invention allows passengers to perform include the following: 1) electronically transfer funds via debit/credit/travel and entertainment or other similar electronic card product account to make purchases or exchange foreign currency, using, for example, a credit card, debit card, or smart card; 2) access the internet to obtain information and perform electronic commerce; 3) obtain information from media services (e.g., CNN); and 4) obtain satellite television programming for purchase of pay per view.

Using a server located aboard the transportation conveyance, in an embodiment of the present invention, passengers perform functions, such as making purchases and making long distance telephone calls, using, for example, a credit card, debit card, or smart card. Tickets are purchasable for such things as movies and tour buses, and points can be earned that are redeemable for cash using the system. Different types of currency are also accessible using, for example, a smart card or electronic purse/wallet.

The present invention thus provides a virtual link between fixed service nodes (e.g., ground-based ATMs/CATs) for traveling customers, such as long-haul travelers over water.

To achieve the stated and other objects of the present invention, as embodied and described below, the invention includes a method for obtaining financial and other information, performing transactions, and providing other services on a large mobile passenger conveyance, comprising: providing access for a user to a terminal, the terminal being coupled to a device for wirelessly transmitting and receiving data; providing for the user to input information; the terminal automatically wirelessly transmitting the information to a wireless communications interface; the wireless communications interface automatically transmitting the information to a communications interface; the communications interface automatically transmitting the information to a host financial computer system, wherein the host system maintains records of user account information; and providing the user with capability to obtain financial information and perform transactions at the terminal.

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To achieve the stated and other objects of the present invention, as embodied and described below, the invention includes a financial and other information, transaction, and other services system for use in a transportation conveyance, comprising: a host financial computer system, the host system
5 maintaining records of user account information; a plurality of user interface terminals for accessing the host financial computer system, at least one of the terminals being coupled to a first communications device for wirelessly transmitting and receiving data, the at least one of the terminals housed on the transportation conveyance; a wireless communications interface comprising a
10 second communications device for wirelessly transmitting and receiving data operatively coupled to the at least one of the terminals via the first communication device for wirelessly transmitting and receiving data; and a communications interface coupled to the wireless communications interface and coupled to the host system; wherein data corresponding to the user account information is exchanged
15 between the host system and the at least one of the terminals coupled to the first communications device for wirelessly transmitting and receiving data via the wireless communications interface and the communications interface, such that information is obtainable and transactions performable on the host financial system, and wherein the information and transactions are transmitted and received
20 by the at least one of the terminals via encrypted data exchanged with the host financial system.

Additional objects, advantages and novel features of the invention will be set forth in part in the description that follows, and in part will become more apparent to those skilled in the art upon examination of the following or upon
25 learning by practice of the invention.

BRIEF DESCRIPTION OF THE FIGURES

In the drawings:

FIG. 1 depicts an ATM/CAT on board a large mobile passenger vehicle, such as an airplane, according to an embodiment of the present invention;
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FIG. 1A presents a system according to an embodiment of the present invention for wirelessly communicating financial information, conducting financial transactions, and providing other services to a large mobile passenger conveyance;

5 FIG. 1B presents a block diagram of an embodiment of the present invention presenting various components for use with a satellite link;

FIG. 2 is a block diagram of a financial information and transaction system in accordance with an embodiment of the present invention;

10 FIG. 3A is a block diagram of a first application of the present invention that includes a wireless transmitting/receiving station;

FIG. 3B is a block diagram showing a second application of the present invention which includes a wireless transmission/receiving station;

FIG. 3C is a perspective view of a cellular telephone terminal in accordance with an embodiment of the present invention;

15 FIG. 4A is a perspective/block view of a first portable wireless transaction and information terminal in accordance with an embodiment of the present invention;

FIG. 4B is a perspective/block view of a second portable wireless transaction and information terminal in accordance with an embodiment of the present invention;

20 FIG. 5 is a block diagram of a wireless transaction and information system in accordance with an embodiment of the present invention;

FIG. 6 is a block diagram of a smart card according to an embodiment of the present invention; and

25 FIG. 7 is a block diagram of a file structure of the smart card of FIG. 5.

DETAILED DESCRIPTION

The present invention comprises a method and system for providing a wide range of electronically delivered financial, information, and other services to passengers aboard airplanes, cruise ships, ferries, tour buses, trains and other large mobile passenger conveyances using satellite or other wirelessly linked terminals.

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The services the invention allows passengers to perform include the following: 1) electronically transfer funds via debit/credit/travel and entertainment or other similar electronic card product account to make purchases or exchange foreign currency, using, for example, a credit card, debit card, or smart card; 2) access the internet to obtain information and perform electronic commerce; 3) obtain information from media services (e.g., CNN); and 4) obtain satellite television programming for purchase of pay per view.

Using a server located aboard the transportation conveyance, in an embodiment of the present invention, passengers perform functions, such as making purchases and making long distance telephone calls, using, for example, a credit card, debit card, or smart card. Tickets are purchasable for such things as movies and tour buses, and points can be earned that are redeemable for goods and/or services using the system. Different types of currency are also accessible using, for example, a smart card or electronic purse/wallet.

The present invention thus provides a virtual link between fixed service nodes (e.g., ground-based ATMs/CATs) for traveling customers, such as long-haul travelers over water. The present invention also provides for a method and system that focuses first on data communications, second on transaction processing, and third on applications at the user interface.

Further, an embodiment of the present invention includes a method and system for dynamically selecting among satellite and wireless connections based on cost and availability of these connections. This dynamic selection feature is locatable within the overall system in a number of places, such as on the large mobile passenger conveyance, in a satellite, or on the ground.

Such connection provides passengers with access to electronic funds transfer organizations on the ground (e.g., Citishare Corp., Diners Corp., Visa/Plus, MasterCard/Cirrus/Maestro, Amex, NYCE, HONOR Technologies, Cash Station, MAC, PULSE, STAR, Europay, JETCO, other functionally similar retail or corporate Electronic Funds Transfer (EFT) organizations worldwide) and allows passengers to facilitate financial transactions (e.g., balance inquiries, value loads to smart cards, value transfers to on board systems, financial transfers,

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payments for services and goods, cash withdrawals, currency exchanges, obtaining sensitive documents (immigration tickets, discount coupons)).

This capability also allows passengers to communicate with the internet for both information and for electronic commerce, including electronic payment;
5 communication with branded and non-branded media services (e.g., msnbc.com, CNN, Dow Jones, Reuters); and connection with direct satellite broadcast television for purchase of pay-per-view shows.

In an embodiment of the present invention, electronic connection allows the operators of the conveyance to interface this data communication to a variety of
10 electronic devices used/accessed by passengers for passenger convenience (e.g., on board cabin file server in an aircraft, ship, train, ferry, or bus); to provide direct connection for in seat passenger entertainment systems, to present at seat debit/credit card readers; to access at seat smart card readers (specifically, readers of microprocessor cards); and to connect capability for video game systems,
15 gambling systems, telephones, document printers, facsimile machines, and other passenger accessed self-service electronic devices.

For example, information and services can be provided by a wireless user interface device, such as a hand held wireless unit located at the customer seat that includes one or more features, such as a card reader, a screen, a keypad, and
20 information or service selection keys. Other examples of user interface devices usable with an embodiment of the present invention include centrally or fixedly located terminals within the large mobile passenger conveyance, mobile terminal devices, and user interface screens located at each seat.

An embodiment of the present invention allows conveyance owners and
25 passengers to perform on-line authorization against debit/credit/travel and entertainment or other similar electronic card product account using, for example, a credit card, debit card, or smart card, for purposes of paying for on-board services or goods; allows passengers to purchase stored value cards or to load microprocessor cards to use on-board for purchase of services or goods, including
30 entertainment, games, and Las Vegas style gambling; allows passengers to electronically obtain prepaid calling account numbers while on-board, from

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telephones, from an in-seat entertainment system, or from a standalone system; these accounts are also downloadable to one pocket of a multi-application microprocessor card.

5 In an embodiment of the present invention, electronic connection also allows passengers to electronically order Duty Free/Tax Free goods from their seats using a touch screen or other display; to enter their delivery name and address; to pay electronically with a debit/credit/transportation and entertainment (T&E) or other similar card account using, for example, a credit card, debit card, or smart card; and to have a choice of picking the goods up on-board, at
10 destination, or having the orders electronically downloaded to a commercial express courier on the ground for immediate dispatch to the named party/delivery address.

In an embodiment of the present invention, passengers also have the capability to take guided tours of their destinations via paid access to video tours
15 stored on the on-board cabin file server, for which dynamic information is updatable by satellite link or wirelessly linked communication; passengers can order sensitive documents and pay for them with their electronic card, including, theater, movie, concert, or sports event tickets, and tour tickets, immigration tickets, and transit tickets for buses at destination. Passengers may load their
20 multi-application microprocessor cards with various currencies by inserting the cards into a smart card reader/writer and, using a telephone or an in-seat entertainment system screen, load value in particular currencies to the card, or, for example, electronically convert currency A in pocket A of the electronic purse to currency B in pocket B of the electronic purse.

25 An embodiment of the present invention allows passengers to electronically load loyalty program points on and off of their loyalty program smart card and/or loyalty program account on the ground; an embodiment also allows passengers to perform such functions as redeeming loyalty points for goods and services, obtaining service upgrades, redeeming points for goods and/or services, and
30 exchanging the points with other passengers.

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Electronic communication also allows passengers to order electronic tickets for travel from their seat and allows passengers at their seat and elsewhere on board to access proprietary financial/information services provided by financial services organizations via the on-board cabin file server, which contains dynamic data (e.g., investment and loan rates; stock quotes) that is updatable via the satellite or other wireless communication link. The present invention also allows passengers to shop electronically, either, for example, via electronic catalogs on the on-board file server or via the internet; orders can be paid for by card, with on-line authorization from the passenger seat; passengers can download their delivery information with the order for delivery by express courier, and passengers can use SET enabled transactions or other forms of secure transacting across the internet for such activities as shopping or purchase of information.

An embodiment of the present invention also provides for electronic statement delivery via an electronic mailbox. This embodiment allows financial alerts to be provided to customers (e.g., certificate of deposit (CD) coming due; mortgage payment past due) via a mailbox electronic statement delivery. For example, in the prior art, the local phone company sends a separate paper late payment notice. In an embodiment of the present invention, a computer places a message in the customer's phone mailbox reminding the customer, for example, that a payment is due. This embodiment also allows delivery of results of requests for archived information (e.g., prior months statements; check images); promotion of product specials (e.g., mortgage rate sales; auto loan specials; one week CD rate specials); provision of cross-sell information on other products (e.g., mutual funds; insurance); and provision of specialized information of critical importance to customers (e.g., daily interest rate quotes prior to lock in of house mortgage; foreign exchange (FX) rates on multicurrency accounts for traveling international customers).

The electronic mailbox aspect of the present invention also serves other purposes in an embodiment of the present invention, including the following: use of the mailbox to store messages for traveling customers to alleviate large time zone differences; delivery of credit report information for a fee; and allowing

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cobranding organizations to provide electronic promotional information to customers (e.g., American Airlines rate specials to Florida in the winter).

An example system according to an embodiment of the present invention utilizing wireless communications on a large mobile passenger conveyance is shown in FIG. 1A. In FIG. 1A, the large mobile passenger conveyance (LMPC) 1 includes a server 1a coupled to a wireless transmitter/receiver 1b for use with, for example, a satellite or other wireless communications link. The server 1b is also coupled to various terminals/interfaces 1c, 1d, and 1e. In addition, wireless user interfaces 1g operatively coupled to the server 1a via a wireless communications device 1f can also be used within the large mobile passenger conveyance 1. In an embodiment of the present invention, some passenger services that are accessible at the user interfaces 1c, 1d, 1e, 1g, are provided by the on-board server 1a.

In an embodiment of the present invention, the LMPC 1 is operatively coupled by satellite link or other wireless communication to an earth station or direct wireless service 2, which is coupled to a communications front-end 3. The communications front-end 3 is in turn coupled, for example, to a financial institution host computer 4, which can include, for example, an ATM/CAT network, a network service provider 5, enabling connection to the internet and other networks, a standard switched network 6, and a private network 7. Combinations of these couplings to the communications front-end may be varied depending on the services provided on the LMPC 1. The communications front-end/switch 3 can include a wide range of functions besides routing and otherwise facilitating communications, including transaction settlement, money movement, exception handling, foreign exchange, and management information systems functions.

An embodiment of the present invention provides for dynamic routing, automatically selecting among satellite or other wireless communications link based on availability and cost of the links.

FIG. 1B presents an embodiment presenting the various components of an embodiment of the present invention for use with a satellite link. As shown in FIG. 1B, in this embodiment, a large mobile passenger conveyance 8, such as an

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airplane, provides information and services to customers on the large mobile passenger conveyance via a wireless link to a satellite 8a. The satellite 8a, which, in an embodiment of the present invention transmits and receives data at about 10,500 bps, in turn is wirelessly linked to a ground-based earth station 8b. The earth station 8b is linked by, for example, land lines, to a communications front end 9, which allows communications to, for example, a financial institution host computer, a network service provider, allowing connection to networks such as an ATM/CAT network or the internet, standard switched networks, private networks, and other network connections 9a.

Other Embodiments Relating to the Wireless Connection

In order to accomplish many of these functions in real time using connection to networks, such as ATM/CAT networks and the internet, an embodiment of the present invention utilizes a satellite or other wireless connection to a network. The wireless connection aspects of the present invention will now be further discussed.

FIG. 2 is a block diagram illustrating a system for providing financial information and performing financial transactions in accordance with another embodiment of the present invention. In this embodiment, a financial institution is represented by block 10. As is known in the art, the financial institution, such as a consumer banking institution, utilizes an automated system, including a host computer, for maintaining records of customer accounts. These records are used to track funds in customer accounts, to enter debits and credits made to such accounts, and for other purposes.

In order to provide various services to the customer, such as providing account information and account debiting and crediting at the customer's request, a communications front end 12 is used to exchange data corresponding to such information. The communication front end 12 provides access to the host computer operated by the financial institution 10 from a variety of communication systems. For example, as shown, the communications front end 12 may exchange data with a standard switch network 14, such as one operated by a regional

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telephone company. Thus, data transfer utilizing such a system generally takes place over a telephone line. In this way, data may be exchanged with a user suitably linked to the standard switch network 14 with a modem using any of a variety of communication protocols known in the art. Moreover, data is exchangeable; in this way other financial institutions and financial networks (not shown), for example, can provide data for settlement of various customer transactions.

Alternately, the communication front end 12 may be connected to a network service provider 16 or a private network 18. For example, one of several commercial services now available may link users throughout a geographic area. Further, the communications front end 12 may provide an interface between the financial institution 10 and a private network 18 comprising, for example, one or more local area networks (LAN) or wide area networks (WAN).

Further, the communications front end in this representation is connected to a direct wireless service 20. For example, such a hook-up could operate at a very high frequency (900 megahertz) along a cellular telephone-type or spread spectrum type connection (900 megahertz with multiplexers) for security purposes. The signal from the direct wireless service 20 may be received by a number of different types of terminals, described below.

As illustrated, FIG. 2 shows direct links between the communications front end 12 and the various types of communication systems 14, 16, 18, and 20. However, it will be understood by those skilled in the art that various combinations of such systems, and others, are possible. For example, a private network 22 may be accessed with the communications front end 12 through a network service provider 16. Alternatively, rather than the direct wireless communication represented by block 20, wireless communication may take place using various commercial wireless service providers 24 via the standard switch network 14. Other networks 26, such as the internet, may be accessed with the standard switch networks 14.

FIGs. 3A and 3B illustrate various applications according to an embodiment of the present invention in which wireless data transmission are

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utilized to provide convenient access to a financial institution, such as the financial institution 10 mentioned above in relation to FIG. 2. For example, FIG. 3A illustrates an application in which a wireless transmitting and receiving station 50 is operatively linked to various terminals A to D distributed on a ship 52 or other large mobile passenger conveyance.

In FIG. 3B, a wireless transmitting and receiving station 54 is operatively linked to a financial server 56 associated with a LAN or WAN on a large mobile passenger conveyance. Various nodes 58, 60, and 64 are provided along the network of the conveyance. One such node 64 shown in FIG. 3B comprises a personal computer, which includes a smart card reader 64a.

FIGs. 4A and 4B illustrate in greater detail embodiments of a wireless terminal in accordance with the present invention. In both of these embodiments and in those that are later described, use is made of devices, methods, and systems for encryption, such as a smart card and a smart card reader. Using encryption techniques, it is possible not only to encode financial information stored remotely by a host computer or locally on the smart card, but also to encode identification information, such as personal identification numbers (PINs). In this way a user's PIN is encryptable by the smart card and communicable to a remote host that has the same encryption key to decode the encrypted PIN and to validate it. This provides authorization to access information stored by the host and/or to request various financial transactions.

FIG. 4A illustrates a first wireless terminal 100 on board a large mobile passenger conveyance for use with a smart card in accordance with an embodiment of the present invention. This terminal 100 includes a customer interface 102, such as an alpha-numerical keypad 104, a display 106, and a smart card reader 108. Signals provided from a wireless service provider, such as one described in FIG. 2, are received by a transmitter/receiver portion 110 of the terminal 100. Conversely, signals are provided from the transmitter/receiver portion 110 of the terminal 100 to a front end processor via wireless service provider. In this manner, the terminal 100 may be used to wirelessly receive and transmit data to and from a financial institution or financial network. This data is

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then readable and writable from and onto a smart card that is inserted into the smart card reader 108.

In this embodiment, the terminal 100 may be advantageously used to read data stored on a smart card to determine, for example, a value corresponding to an amount of funds existing in the user's account. With the terminal 100, the user may add to the amount stored on the card and have the added amount debited from the user's account by the host computer. In such a way, the terminal thereby functions as a credit-authorization terminal. The authorization and financial information is kept secure during transmission as a result of the encryption capabilities of a smart card that is used to access the terminal 100.

For example, in accordance with an embodiment of the present invention, the user inserts a smart card into the smart card reader 108. The card first encrypts, and then transmits to the terminal 100 information stored on the smart card. This information identifies the financial institution that maintains the user's account, as well as the user's account number. Additional security is obtainable by requiring that the user input a PIN with the numeric keypad. Again, the smart card then encrypts the PIN for transmission by the terminal to a host computer for verification.

Once authorization is obtained, the user is able to determine the user's current account balance and/or request that value be added to the card. In executing these requests, the terminal exchanges encoded information by wireless transmission with a financial network, such as one described above with respect to FIG. 2. For example, the terminal may be used to directly add value to the user's card, and then request by wireless transmission that the customer's account be debited a corresponding amount. These requests comprise encoded data that is decoded by the host computer associated with the financial institution.

When the funds are transferred to and from the smart card, an encrypted bank signature appended to the funds certifies that the funds are "real." It also ensures that when the transaction enters the settlement system, the funds are validated. Because the settlement system may involve more than one financial

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institution, when the transaction is ultimately presented to the financial institution for payment, the encrypted bank signature verifies that the transaction is authentic.

In the embodiment shown in FIG. 4A, the terminal 100 on board a large mobile passenger conveyance is operated with a standard AC supply 112 from a conventional outlet. In the embodiment of FIG. 4B (in which identical reference numerals are used to refer to corresponding structure described in reference to FIG. 4A), a terminal 120 on board a large mobile passenger conveyance is powered by rechargeable batteries 122 in order to provide mobility within the large mobile passenger conveyance.

It will be appreciated that such a terminal as described in reference to FIGs. 4A and 4B permits the user to conduct numerous financial transactions without a hard wired connection between the terminal and the financial institution. For example, the terminal is usable to "recharge" the smart card in the manner described above. After "recharging," the user may then use the card in connection with terminals that accept "electronic cash" in lieu of cash by deducting an amount from the user's card. The amount deducted is then redeemable by a merchant through a settlement process with the user's financial institution (and others).

FIG. 5 illustrates another embodiment of the invention in which a wireless server/terminal unit 150 on board a large mobile passenger conveyance is used to exchange financial information between a user and a remote host computer of a financial institution, such as that referred to in FIG. 2. The wireless server/terminal unit 150 preferably includes a terminal described above in reference to FIGs. 4A and 4B (i.e., a terminal that incorporates a display, a keypad, a smart card reader, and communication capability for wireless transmission of data).

The system shown in FIG. 5 integrates the capability of exchanging financial information with other non-financial functionality, such as security control and other customer functions, such as internet browsing and obtaining tickets and services. In particular, the wireless server/terminal unit 150 forms a portion of a LAN that comprises a variety of other computers and networks. As illustrated, these other computers and networks include personal computers (PCs)

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158, 152, a WAN 156, a local computer system 154, a conventional ATM/CAT 160, and a spread spectrum server 162.

5 A variety of terminals and associated devices are coupled to the networks shown. For example, the WAN 156 includes PCs 166, 168. An access system 174 includes various smart card readers 170, some of which are equipped with keypads. Similarly, each of the PCs 152, 158 are equipped with smart card readers 152a, 158a.

10 Also, a plurality of terminals located on a large mobile passenger vehicle, represented by the terminal 172, are coupled to the spread spectrum server 162. For example, the terminal 172 is equipped with a smart card reader 172a. In this way, the wireless financial server terminal 150 enables access to a financial institution through a variety of methods and devices and from a variety of locations.

15 In particular, the wireless smart card recharge station 172 on board the large mobile passenger conveyance communicates to the financial institution via the spread spectrum receiver 162 and the server terminal 150. The recharge station 172 has a slot for receiving and reading a smart card and a display (see FIGs. 4A and 4B). Through its connection with a financial system, such as that shown in FIG. 2, the user makes selections from a menu displayed on the display of the terminal 172. For example, the user may review account balances, transfer funds, or perform other activities typically available on a fixed-location ATM/CAT. The user may also reload monetary value onto the smart card via the cash station, adding set funds to either a "prepaid" or "purse" account on the smart card, as described below. In this way, the user can obtain access to money via a portable ATM/CAT-type terminal without security risk because no cash is directly involved. At the end of the user's visit to a location where the smart card is honored, the user may employ the station to deposit any unused balances from the user's smart card to the user's account with the financial institution.

25 As shown, a PC 152 may be connected to a smart card reader, such as one having a keypad and processing capabilities. This enables the user to access the user's financial accounts and to "recharge" the smart card (that is, add funds onto

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the smart card). In this respect, the keypad enables the user to enter the user's PIN, and the smart card inserted into reader 152a provides additional encryption and security measures to make the transport route (namely, the LAN/wireless terminal/route) sufficiently secure to conduct financial transactions. A similar arrangement is conducted at other remote locations through a telephone line connection between the terminal and other personal computers connected to a smart card reader/processor and keypad. Further, a smart card reader/processor with a display that simulates an ATM/CAT protocol could be connected to the terminal, thereby enabling the user to perform all ATM/CAT functions, including recharging the smart card, without the use of a personal computer.

Thus, the server terminal 150 provides a communications channel for several remote devices, such as the PC 152, 158 and the terminals 172 associated with the spread spectrum server 162 and those associated with the wide area network 156. By providing card readers with these terminals, it is possible to obtain a wide range of access points to a remote host computer via the wireless financial server/terminal. This provides additional capabilities to the above-described financial information and transactions.

FIG. 6 illustrates a multi-purpose smart card 200 according to an embodiment of the present invention that permits both financial and non-financial functions in an integrated system such as that described in FIG. 5. The smart card 200 comprises a central processing unit (CPU) 202, which is connected to a read only memory (ROM) 204 that is primarily used for storage of an operating system. A random access memory (RAM) 206 is also provided for volatile storage of data, particularly for program execution. The CPU 202 is operatively coupled to a serial interface 208, which in turn communicates with a smart card reader 210 according to techniques well known in the art.

The CPU is connected to an arithmetic logic unit 212, for example, one suitable for processing large keys (512 byte keys). An electrically erasable programmable read only memory (EEPROM) 214 is provided, which typically stores system files and applications.

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As illustrated in FIG. 7, the smart card 200 of FIG. 6 has different file paths for different functions. The EEPROM has a master file 220 and dedicated files for different applications. These dedicated files include a biometric identification file 222 and an encrypted digital signature file 224. Also included is an access file 226
5 that contains information enabling the card to be used in conjunction with a security system, such as the one referred to in FIG. 5. The master file 220 also is linked to a banking card debit file 228, which may also have its own security path for identification. The smart card has a prepaid function path 230, which can only be loaded through a secure function, and a "non-secure" electronic purse function
10 file 232. These files are readable by an external terminal, such as the terminal described in reference to FIGs. 4A and 4B. These files may be decremented as required from an outside terminal, as described more fully below.

In this example, the master file 220 also has a digital encryption capability 234, which provides algorithmic computation for the processing of digital keys
15 and encryption of, for example, the user's PIN. The algorithms used may provide symmetrical or asymmetrical encryption, as known in the art.

In the aforementioned embodiments, the smart card incorporates optional digital encryption signatures and encryption algorithms to enable the smart card to be validated from a remote location, such as a host computer at a financial
20 institution or at off/on line merchant terminals equipped with a SAM module for off-line card authentication. In such instances both ends of the communication (for example, the host computer and the smart card) may each have an encryption key so that data (such as a PIN entry) which is sent via the smart card 60 is validated at the host computer. Thus, the host computer is able to validate that the
25 smart card is authentic and that the proper user is using the smart card so that a secure financial transaction can take place.

Embodiments of the present invention have now been described in fulfillment of the above objects. It will be appreciated that these examples are merely illustrative of the invention. Many variations and modifications will be
30 apparent to those skilled in the art.

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CLAIMS:

- 1 1. A method for obtaining financial and other information, performing
2 transactions, and obtaining other services on a large mobile passenger conveyance,
3 comprising:
4 providing access for a user to a terminal, the terminal being coupled to a
5 device for wirelessly transmitting and receiving data;
6 providing for the user to input information;
7 the terminal automatically wirelessly transmitting the information to a wireless
8 communications interface;
9 the wireless communications interface automatically transmitting the
10 information to a communications interface;
11 the communications interface automatically transmitting the information to a
12 host financial computer system, wherein the host system maintains records of user
13 account information; and
14 providing the user with capability to obtain financial and other information,
15 perform transactions, and obtain other services at the terminal.
- 1 2. The method of claim 1 wherein the terminal automatically wirelessly
2 transmitting the information to a wireless communications interface comprises the
3 terminal automatically transmitting the information via one from the group of a
4 satellite link and a wireless communications link.
- 1 3. The method of claim 1 wherein the terminal includes a user interface
2 device remote from the first communications device.
- 1 4. The method of claim 3 wherein the user interface device is operatively
2 coupled to the first communications device.
- 1 5. The method of claim 1 further comprising
2 the user inputting identification information;
3 the terminal automatically wirelessly transmitting the identification
4 information to a wireless communications interface;

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5 the wireless communications interface automatically transmitting the
6 identification information to a communications interface;
7 the communications interface automatically transmitting the identification
8 information to a host financial computer system, wherein the host system maintains
9 records of user account information;
10 the host system automatically verifying the identification information;
11 the host system automatically transmitting authorization information to the
12 communications interface;
13 the communications interface automatically transmitting the authorization
14 information to the wireless communications interface; and
15 the wireless communications interface automatically wirelessly transmitting
16 the authorization information to the terminal.

1 6. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing the user with an option to select a function from a group of financial
5 information and transaction functions;
6 the terminal automatically wirelessly transmitting data for a selected function
7 to a wireless communications interface;
8 the wireless communications interface automatically transmitting the data for
9 the selected function to the communications interface;
10 the communications interface automatically transmitting the data for the
11 selected function to the host financial computer system, the host system maintaining
12 records of user account information;
13 the host system automatically performing the function in response to the
14 transmitted data for the selected function;
15 the host system automatically transmitting data for the performed function to
16 the communications interface;
17 the communications interface automatically transmitting the data for the
18 performed function to the wireless communications interface; and
19 the wireless communications interface automatically wirelessly transmitting
20 the data for the performed function to the terminal.

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1 7. The method of claim 1 wherein the passenger conveyance comprises
2 one from the group of an airplane, a cruise ship, a ferry, a tour bus, and a train.

1 8. The method of claim 6 wherein the group of financial information and
2 transaction functions comprises banking card debit, electronic prepaid function,
3 electronic purse function, and debit, credit, travel, and entertainment or other similar
4 electronic card product account functions.

1 9. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes providing an option to access a network.

1 10. The method of claim 9 wherein the network comprises the internet.

1 11. The method of claim 9 further comprising:
2 providing an option to make electronic payments.

1 12. The method of claim 9 further comprising:
2 if the option to access a network is selected, providing an option to access
3 non-branded media services.

1 13. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to connect to direct satellite broadcast television; and
5 if the option to connect to direct satellite broadcast television is selected,
6 providing an option to purchase pay-per-view shows.

1 14. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to access passenger convenience systems.

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1 15. The method of claim 14 wherein the passenger convenience systems
2 include one from the group of video game systems, gambling systems, telephones,
3 document printers, and facsimile machines.

1 16. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to perform on-line authorization functions.

1 17. The method of claim 16 wherein the on-line authorization functions
2 include one from the group of debit account, credit account, travel account, and
3 entertainment account for on-board services and goods.

1 18. The method of claim 16 wherein the on-line authorization functions
2 include one from the group of purchasing stored value cards, loading
3 microprocessor cards for use for on-board services or goods, obtaining prepaid
4 calling account numbers, obtaining in-seat entertainment system services,
5 obtaining standalone system services, and downloading accounts from a pocket of
6 a multi-application microprocessor card.

1 19. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to electronically order duty free/tax free goods.

1 20. The method of claim 19 wherein providing the option to
2 electronically order further comprises providing use of a touch screen to enter at
3 least one from the group of delivery name and address, a selection to pay
4 electronically with a debit/credit/travel and entertainment card, a selection of a
5 choice to pick up the goods, and a selection to have the goods delivered to a
6 destination.

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- 1 21. The method of claim 20 further comprising:
2 if the selection to have the goods delivered to a destination is selected,
3 transmitting a message to effect delivery of the goods.
- 1 22. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to take a video guided tour of a destination.
- 1 23. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to order tickets.
- 1 24. The method of claim 23 wherein the tickets include one from the
2 group of theater tickets, movie tickets, concert tickets, sports events tickets, tour
3 tickets, immigration tickets, transit tickets, bus tickets, and special show tickets.
- 1 25. The method of claim 24 wherein the special show tickets include
2 museum tickets.
- 1 26. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to electronically load loyalty program points to and
5 from at least one from the group of a smart card and a loyalty program account.
- 1 27. The method of claim 26 wherein the loyalty program points are
2 redeemable for one from the group of goods and services, service upgrades, cash,
3 and points exchanged with other passengers.

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1 28. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to shop electronically.

1 29. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to access financial and information services.

1 30. The method of claim 29 wherein the financial and information
2 services are accessed via a file server located on the large mobile passenger
3 conveyance.

1 31. The method of claim 30 wherein the file server contains data and
2 wherein the data is updatable via a communications link, the communications link
3 including one from the group of a satellite link and a wireless communications
4 link.

1 32. The method of claim 1 wherein providing the user with capability to
2 obtain financial and other information, perform transactions, and obtain other services
3 at the terminal further includes:
4 providing an option to select electronic statement delivery via an electronic
5 mailbox.

1 33. The method of claim 32 further comprising:
2 if the option to select electronic statement delivery is selected,
3 automatically generating a computer message; and
4 automatically delivering the computer message to the electronic mailbox.

1 34. The method of claim 32 wherein promotional information is
2 deliverable to the electronic mailbox.

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1 35. The method of claim 1 wherein the terminal automatically wirelessly
2 transmitting the information to a wireless communications interface is performed via
3 one from the group of a satellite link and a wireless communications link; and wherein
4 the terminal automatically wirelessly transmitting the information to a wireless
5 communications interface further comprises automatically dynamically selecting
6 routing.

1 36. The method of claim 35 wherein automatically dynamically selecting
2 routing includes:
3 automatically determining the availability of the satellite link and the wireless
4 communications link;
5 automatically determining an associated cost for the satellite link and the
6 wireless communications link; and
7 automatically selecting between the satellite link and the wireless
8 communications link based on availability and cost.

1 37. A financial and other information, transaction, and other services
2 system for use in a transportation conveyance, comprising:
3 a host financial computer system, the host system maintaining records of
4 user account information;
5 a plurality of user interface terminals for accessing the host financial
6 computer system, at least one of the terminals being coupled to a first
7 communications device for wirelessly transmitting and receiving data, the at least
8 one of the terminals housed on the transportation conveyance;
9 a wireless communications interface comprising a second communications
10 device for wirelessly transmitting and receiving data operatively coupled to the at
11 least one of the terminals via the first communication device for wirelessly
12 transmitting and receiving data; and
13 a communications interface coupled to the wireless communications
14 interface and coupled to the host system;
15 wherein data corresponding to the user account information is exchanged
16 between the host system and the at least one of the terminals comprising the first

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17 communications device for wirelessly transmitting and receiving data via the
18 wireless communications interface and the communications interface, such that
19 information is obtainable and transactions performable on the host financial
20 system, and wherein the information and transactions are transmitted and received
21 by the at least one of the terminals via encrypted data exchanged with the host
22 financial system.

1 38. The financial information and transaction system of claim 37
2 wherein the wireless communications interface comprises one from the group of a
3 satellite link and a wireless communications link.

1 39. The financial information and transaction system of claim 37
2 wherein the at least one of the terminals includes a user interface device remote from
3 the first communications device.

1 40. The financial information and transaction system of claim 37
2 wherein the user interface device is operatively coupled to the first communications
3 device.

1 41. The financial information and transaction system of claim 37
2 wherein the at least one of the terminals comprises a dynamic routing selector.

1 42. The method of claim 41 wherein the dynamic routing selector includes:
2 means for automatically determining the availability of the satellite link and
3 the wireless communications link;
4 means for automatically determining an associated cost for the satellite link
5 and the wireless communications link; and
6 means for automatically selecting between the satellite link and the wireless
7 communication link based on availability and cost.

1 43. The financial information and transaction system of claim 37
2 wherein the communications interface comprises a dynamic routing selector.

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1 44. The financial information and transaction system of claim 37
2 wherein the wireless communications interface comprises a dynamic routing selector.

1 45. The financial information and transaction system of claim 37
2 wherein the host financial computer system comprises a dynamic routing selector.

1 46. The financial information and transaction system of claim 37
2 wherein the terminal further includes a smart card device.

1 47. The financial information and transaction system of claim 37
2 wherein the data is encrypted via use of a smart card.

1 48. The financial information and transaction system of claim 37,
2 wherein the at least one terminal is operatively coupled to a security system for
3 controlling access to various physical locations each associated with a smart card
4 reader, the security system providing access to the various locations by matching
5 information stored on a user smart card which is inserted into the associated smart
6 card readers.

1 49. The financial information and transaction system of claim 37,
2 wherein the terminal comprises an automatic teller machine.

1 50. The financial information and transaction system of claim 37,
2 wherein the terminal comprises a foreign exchange device.

1 51. The financial information and transaction system of claim 37,
2 further comprising a host computer for a network, wherein at least one of the
3 terminals is connectable to the network via the host computer.

1 52. The financial information and transaction system of claim 51
2 wherein the network is the internet.

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1 53. The financial information and transaction system of claim 37,
2 wherein at least one of the plurality of user interface terminals further comprises
3 an internet browser.

1 54. A system for obtaining financial and other information, performing
2 transactions, and obtaining other services on a large mobile passenger conveyance,
3 comprising:
4 means for providing access for a user to a terminal, the terminal being coupled
5 to a device for wirelessly transmitting and receiving data;
6 means for providing for the user to input information;
7 means for the terminal automatically wirelessly transmitting the information to
8 a wireless communications interface;
9 means for the wireless communications interface automatically transmitting
10 the information to a communications interface;
11 means for the communications interface automatically transmitting the
12 information to a host financial computer system, wherein the host system maintains
13 records of user account information; and
14 means for providing the user with capability to obtain financial information
15 and perform transactions at the terminal.

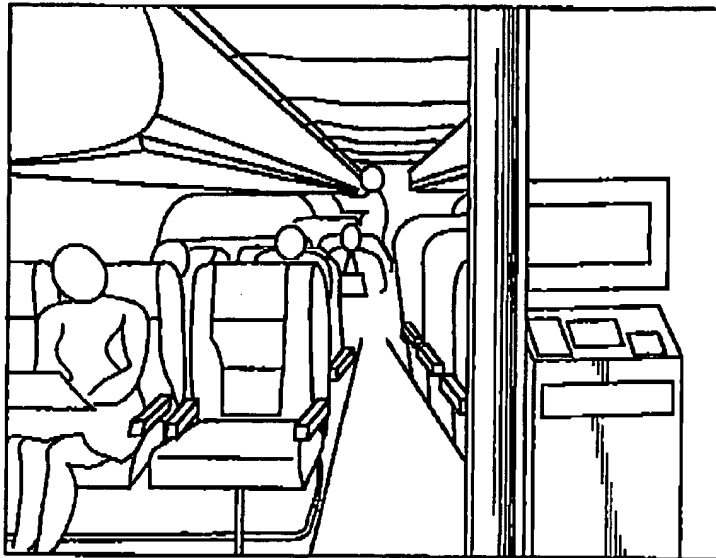
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FIG. 1

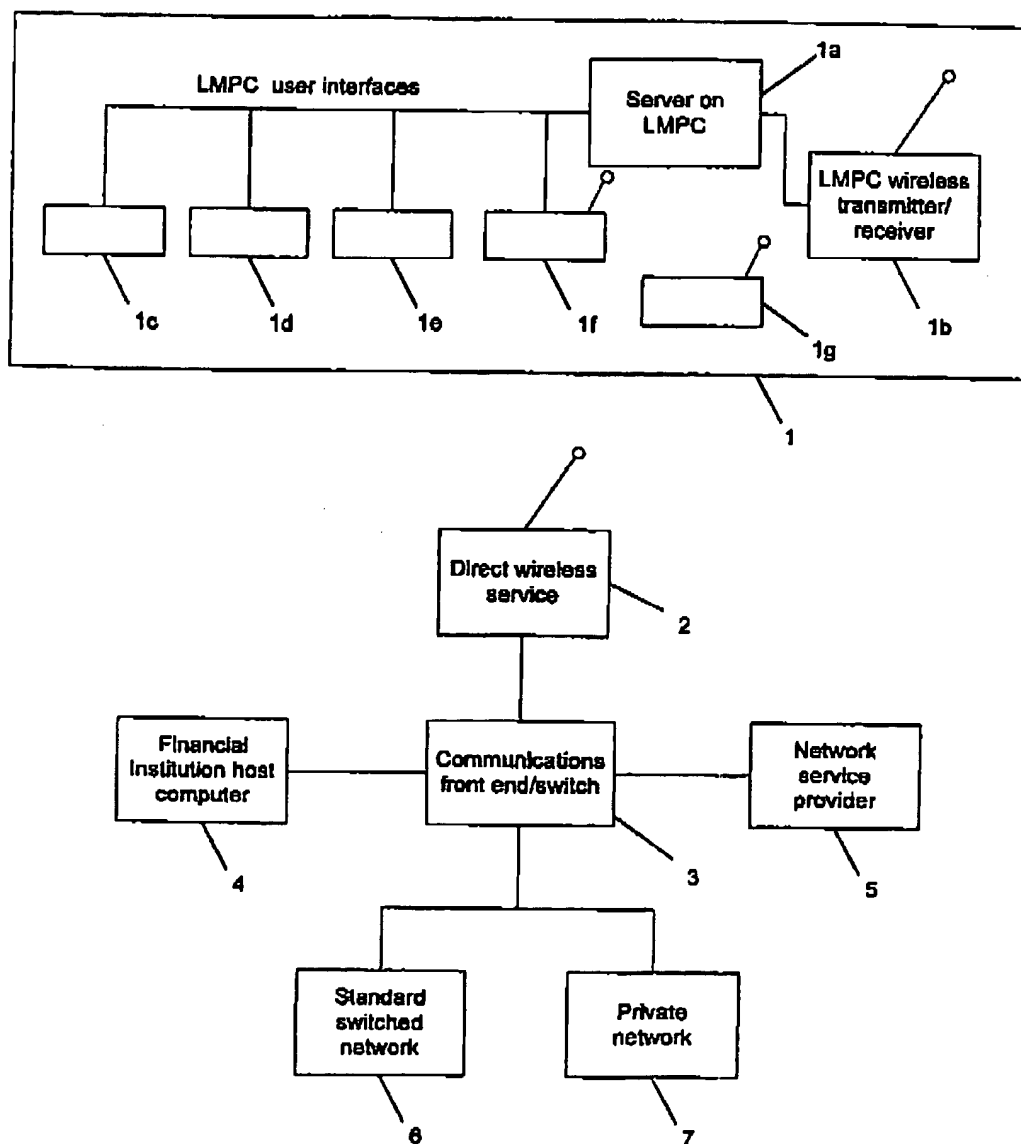


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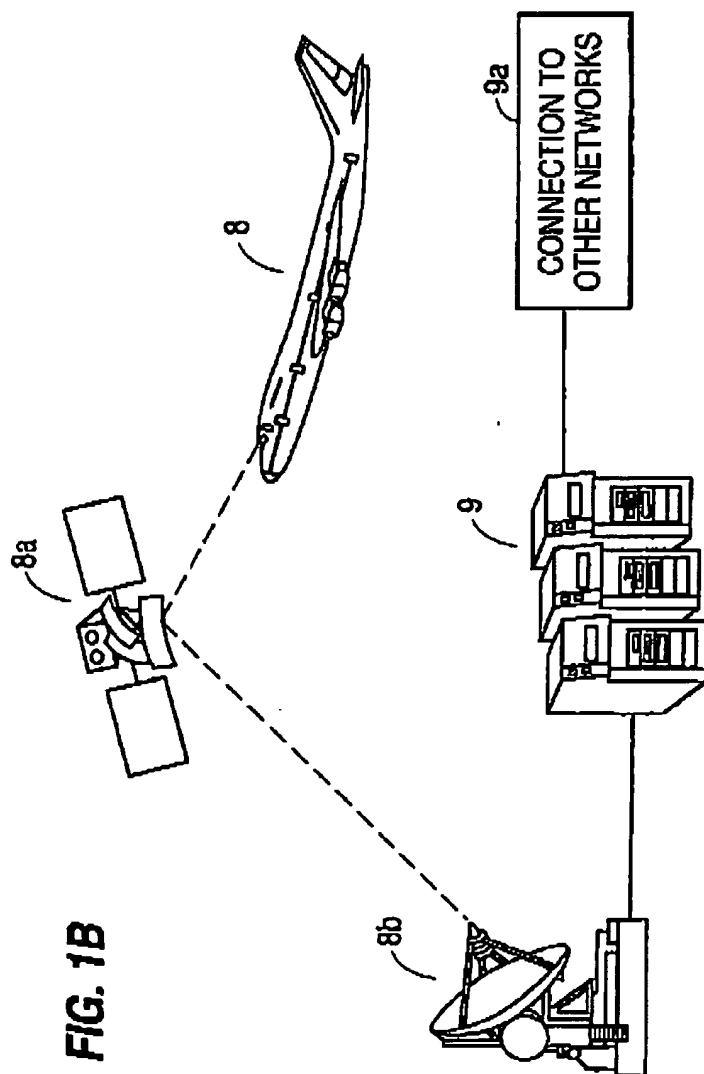
FIG. 1A

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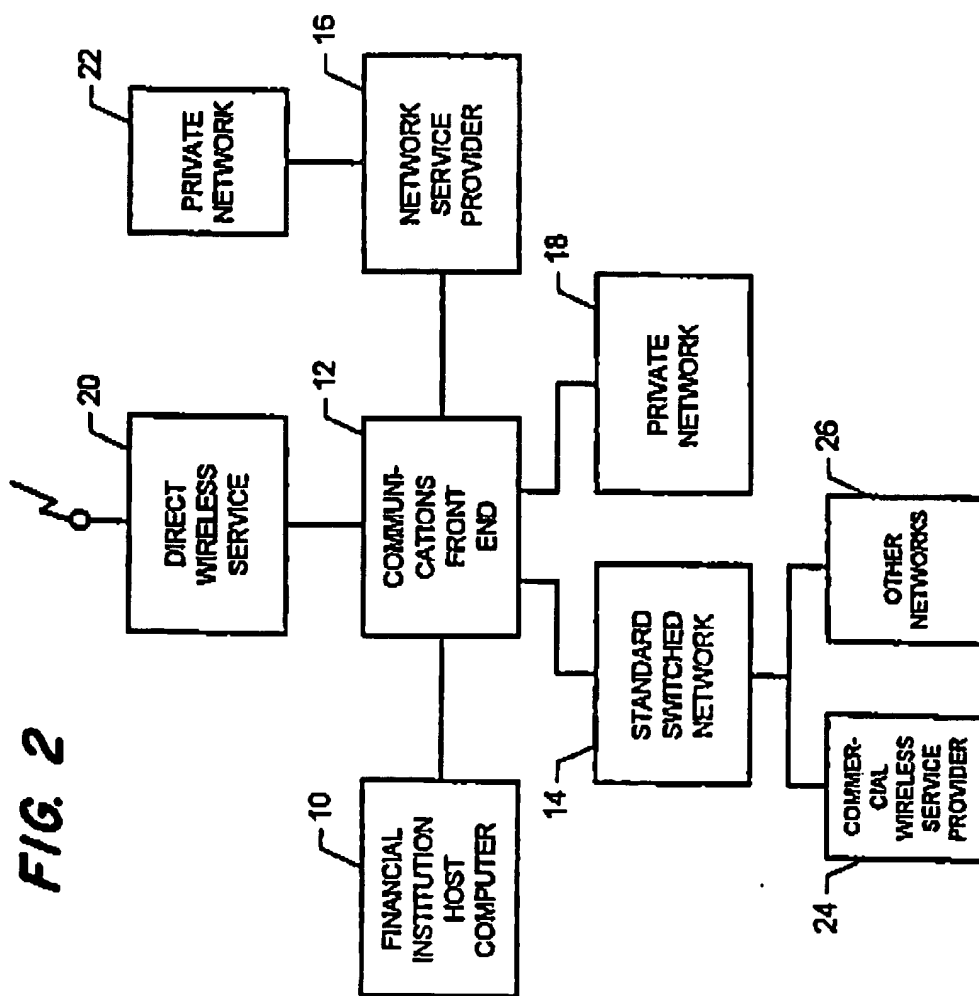


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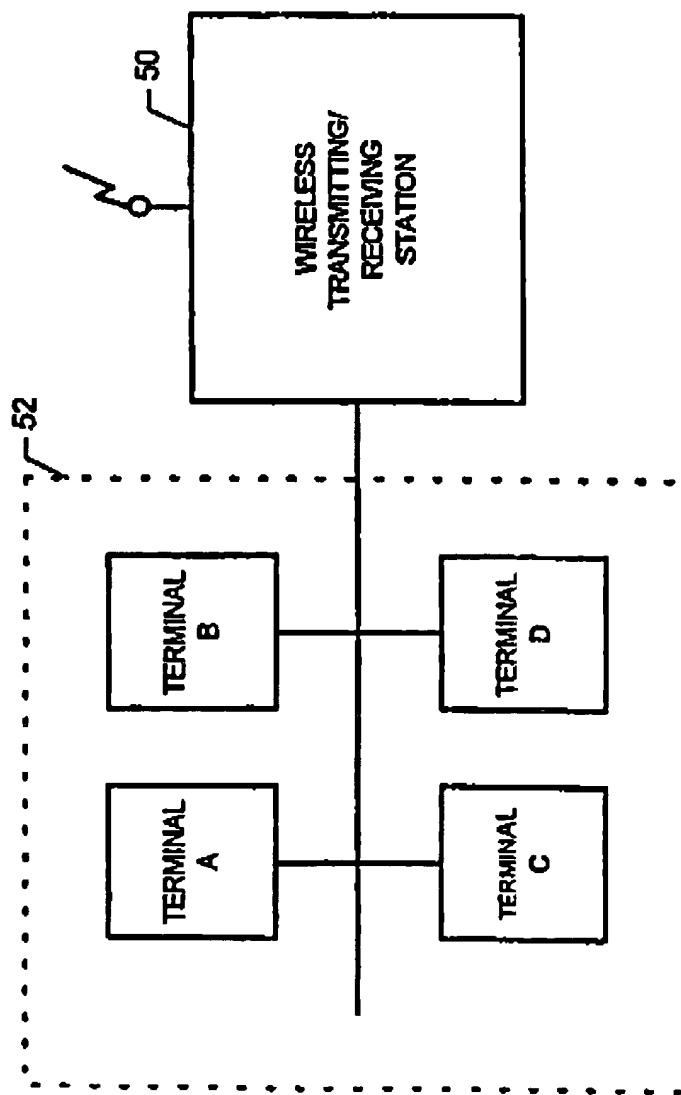


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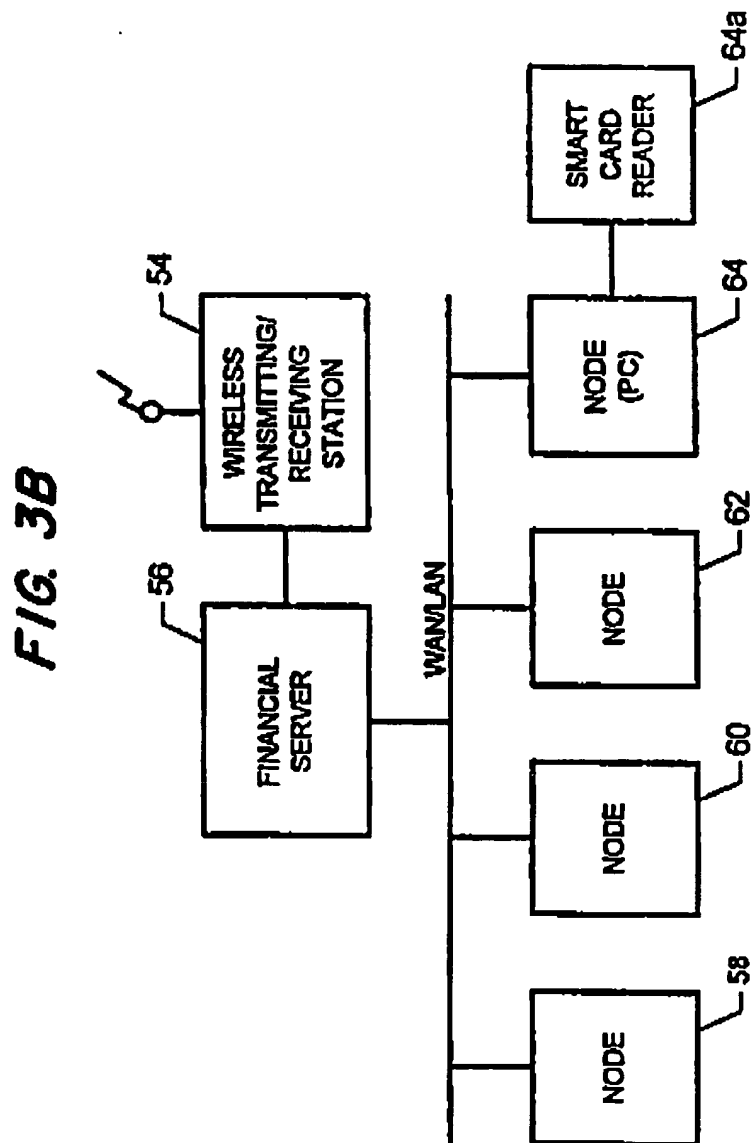
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FIG. 3A**SUBSTITUTE SHEET (rule 26)**

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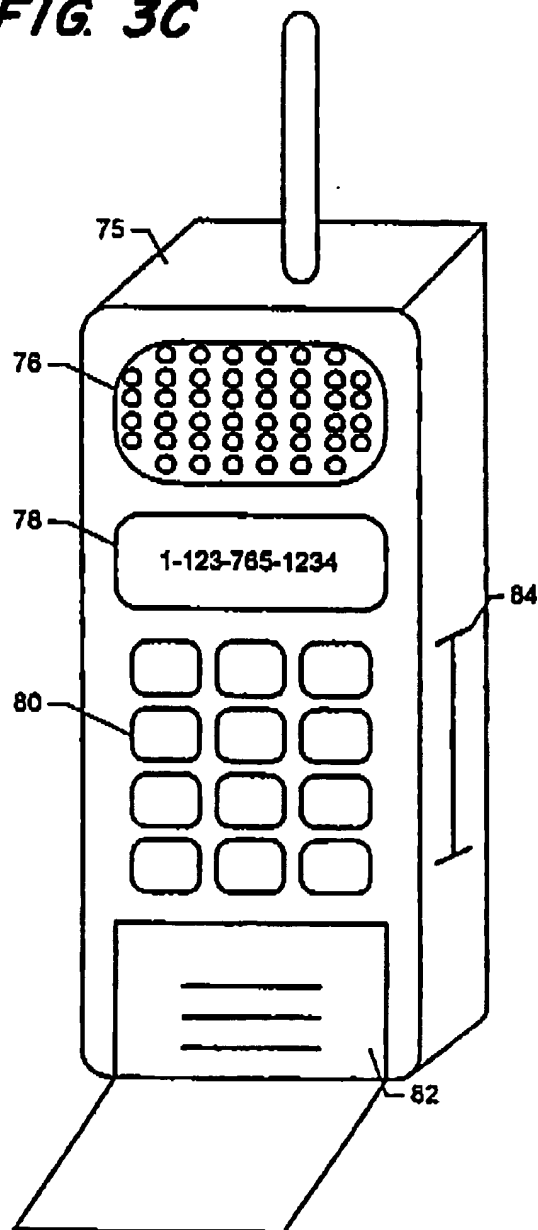


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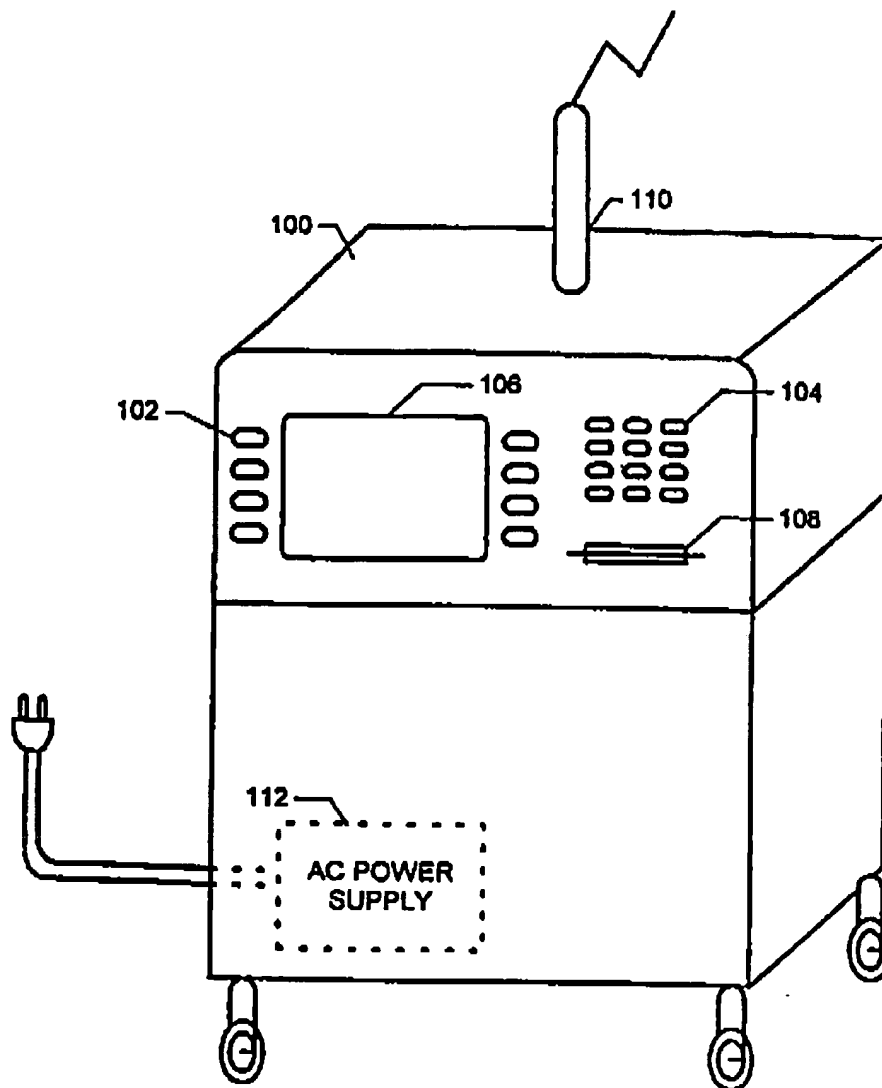
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FIG. 3C**SUBSTITUTE SHEET (rule 26)**

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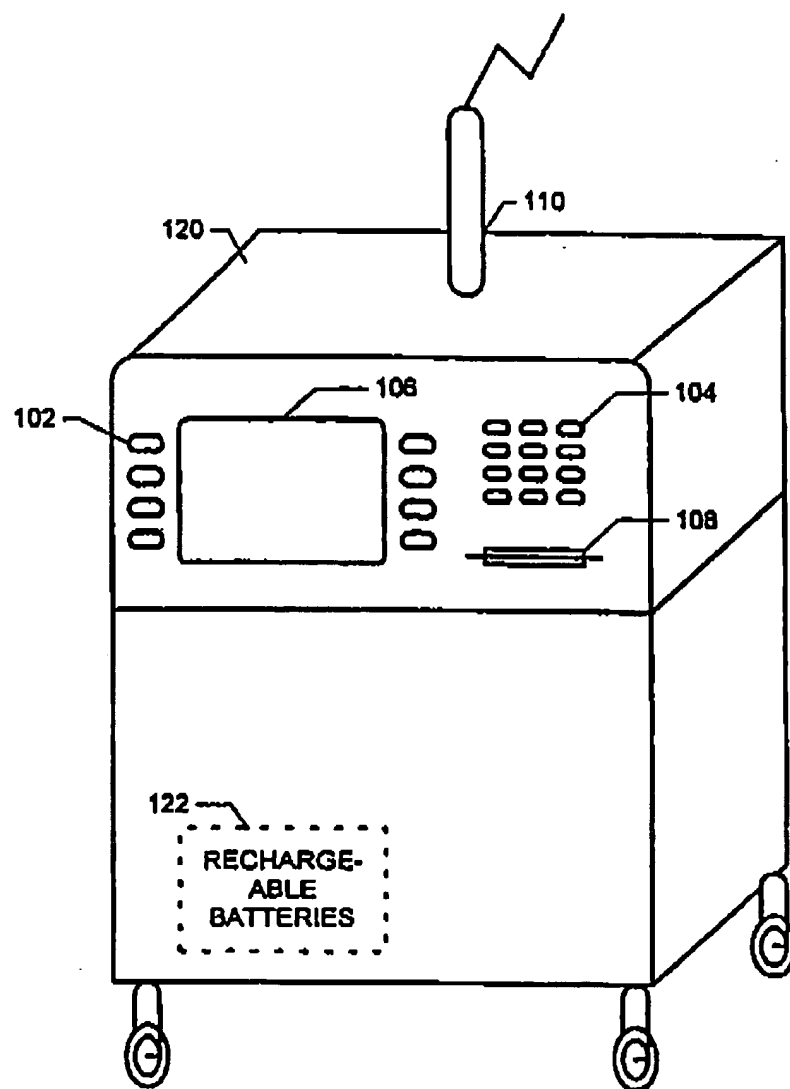
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FIG. 4A**SUBSTITUTE SHEET (rule 26)**

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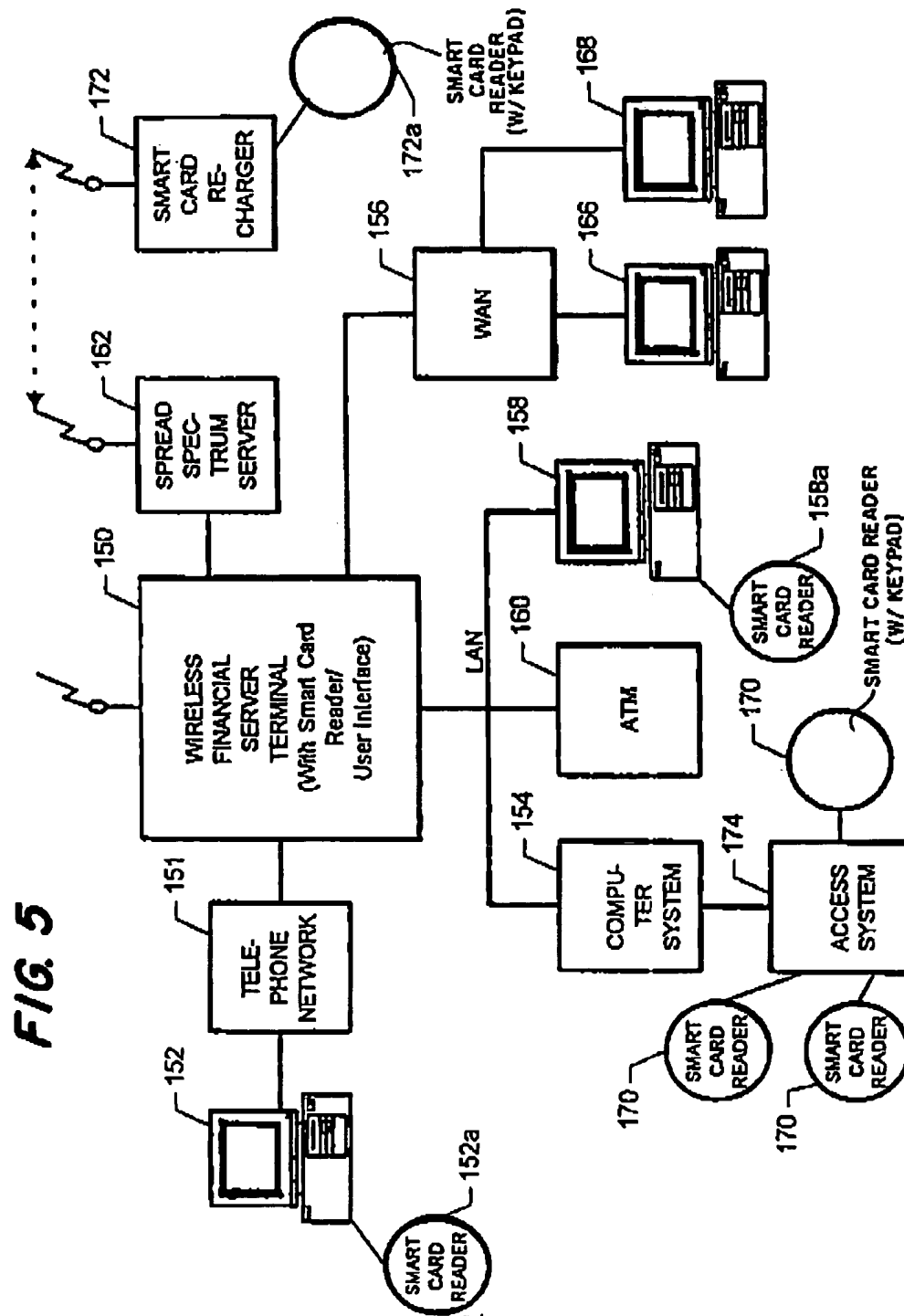
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FIG. 4B**SUBSTITUTE SHEET (rule 26)**

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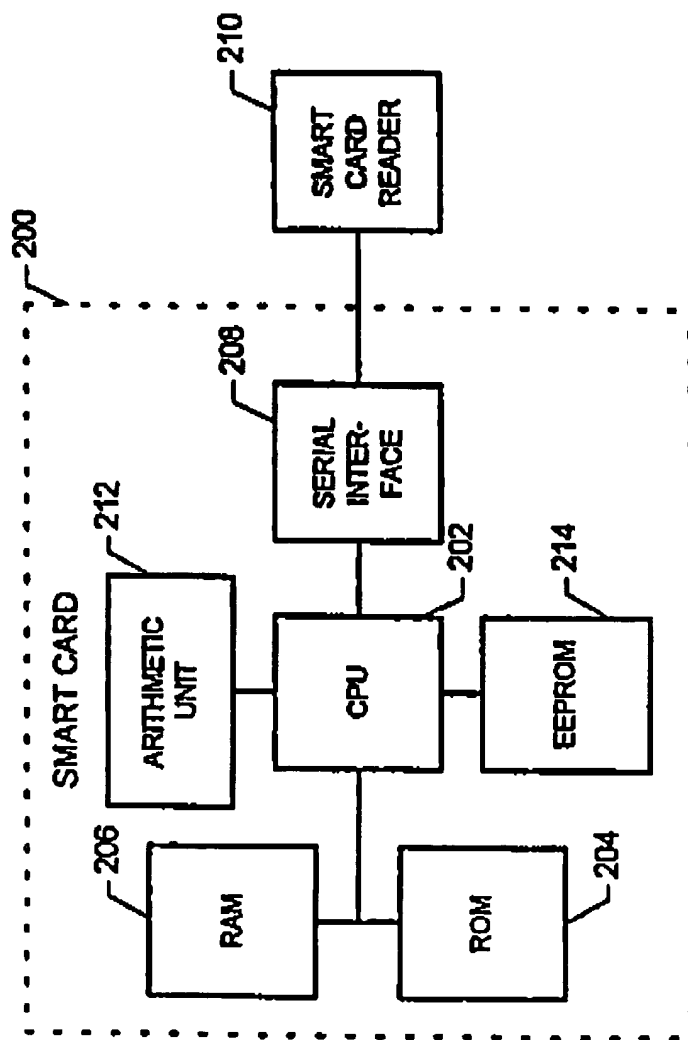


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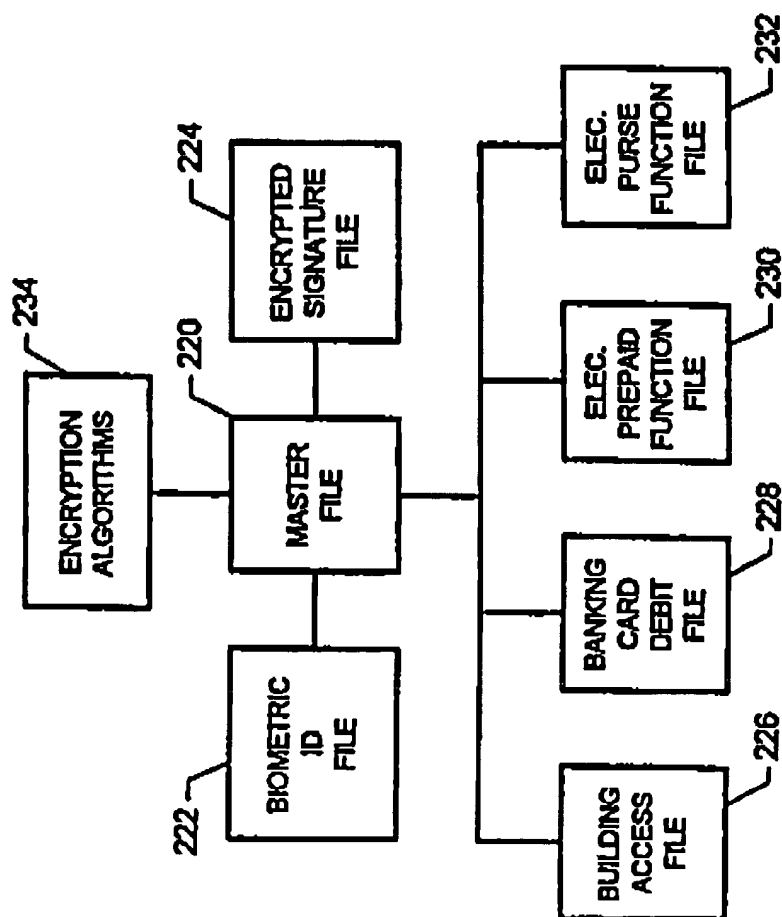
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FIG. 6**SUBSTITUTE SHEET (rule 26)**

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FIG. 7

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INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G06F 153:00

US CL : 705/35

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/29, 35, 37-39

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
T	US 5,797,126 A (HELBLING et al.) 18 August 1998, column 2, lines 4-45 and column 7, line 29 to column 10, line 32.	1-54
A	US 5,581,461 A (COLL et al.) 03 December 1996, column 2, line 33 to column 9, line 40.	1-54
A	US 5,576,951 A (LOCKWOOD) 19 November 1996, column 8, line 54 to column 14, line 14.	1-54
A	US 5,475,585 A (BUSH) 12 December 1995, column 2, line 50 to column 6, line 58.	1-54

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T	later document published after the international filing date or priority date and not in conflict with the application but tending to understand the principle or theory underlying the invention
A documents defining the general state of the art which is not considered to be of particular relevance	*X*	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier documents published on or after the international filing date	*Y*	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L documents which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A*	document member of the same patent family
O documents referring to an oral disclosure, use, exhibition or other means		
P documents published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

08 JANUARY 1999

Date of mailing of the international search report

12 MAR 1999

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